SEQUENCE LISTING

<110> The Iams Company
Davenport, Gary Mitchell
Matthews, Jamie Clyde

<120> Compositions and Methods for Increasing Amino Acid Absorption in Mammals

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<151> 2001-03-02

<150> US 60/344,088
<151> 2001-12-26

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Lys Phe Lys Thr Ile Val Ser Leu Ser Ile Val Tyr Thr Ile Gly Gln
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Leu Met Ala Val Ser Leu Ile Val Phe Val Ile Gly Ser Gly Met Tyr
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Trp Thr Leu Gln Ala Thr Ala Met Ser Gly Lys Ile Gly Leu Leu Glu
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<211> 706
<212> PRT
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Ser Val Ser Ser Ile Asn Asp Leu Thr Asp His Asn His Asp Gly Thr
100 105 110
Pro Asp Ser Leu Pro Val His Val Val Leu Ser Leu Ile Gly Leu Ala
115 120 125
Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser Ala Phe
130 135 140
Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn Arg Phe
145 150 155 160
Phe Ser Ile Phe Tyr Leu Ala Ile Asn Ala Gly Ser Leu Leu Ser Thr
165 170 175
Ile Ile Thr Pro Met Leu Arg Val Gln Gln Cys Gly Ile His Ser Lys
180 185 190
Gln Ala Cys Tyr Pro Leu Ala Phe Gly Val Pro Ala Ala Leu Met Ala
195 200 205

Val Ala Leu Ile Val Phe Val Leu Gly Ser Gly Met Tyr Lys Lys Phe
210 215 220
Lys Pro Gln Gly Asn Ile Met Gly Lys Val Ala Lys Cys Ile Gly Phe
225 230 235 240
Ala Ile Lys Asn Arg Phe Arg His Arg Ser Lys Ala Phe Pro Lys Arg
245 250 255
Glu His Trp Leu Asp Trp Ala Lys Glu Lys Tyr Asp Glu Arg Leu Ile
260 265 270
Ser Gln Ile Lys Met Val Thr Arg Val Met Phe Leu Tyr Ile Pro Leu
275 280 285
Pro Met Phe Trp Ala Leu Phe Asp Gln Gln Gly Ser Arg Trp Thr Leu
290 295 300
Gln Ala Thr Thr Met Ser Gly Lys Ile Gly Ala Leu Glu Ile Gln Pro
305 310 315 320
Asp Gln Met Gln Thr Val Asn Ala Ile Leu Ile Val Ile Met Val Pro
325 330 335
Ile Phe Asp Ala Val Leu Tyr Pro Leu Ile Ala Lys Cys Gly Phe Asn
340 345 350
Phe Thr Ser Leu Lys Lys Met Ala Val Gly Met Val Leu Ala Ser Met
355 360 365
Ala Phe Val Val Ala Ala Ile Val Gln Val Glu Ile Asp Lys Thr Leu
370 375 380
Pro Val Phe Pro Lys Gly Asn Glu Val Gln Ile Lys Val Leu Asn Ile
385 390 395 400
Gly Asn Asn Thr Met Asn Ile Ser Leu Pro Gly Glu Met Val Thr Leu
405 410 415
Gly Pro Met Ser Gln Thr Asn Ala Phe Met Thr Phe Asp Val Asn Lys
420 425 430
Leu Thr Arg Ile Asn Ile Ser Ser Pro Gly Ser Pro Val Thr Ala Val
435 440 445
Thr Asp Asp Phe Lys Gln Gly Gln Arg His Thr Leu Leu Val Trp Ala
450 455 460
Pro Asn His Tyr Gln Val Val Lys Asp Gly Leu Asn Gln Lys Pro Glu
465 470 475 480
Lys Gly Glu Asn Gly Ile Arg Phe Val Asn Thr Phe Asn Glu Leu Ile
485 490 495
Thr Ile Thr Met Ser Gly Lys Val Tyr Ala Asn Ile Ser Ser Tyr Asn
500 505 510
Ala Ser Thr Tyr Gln Phe Phe Pro Ser Gly Ile Lys Gly Phe Thr Ile
515 520 525
Ser Ser Thr Glu Ile Pro Pro Gln Cys Gln Pro Asn Phe Asn Thr Phe
530 535 540
Tyr Leu Glu Phe Gly Ser Ala Tyr Thr Tyr Ile Val Gln Arg Lys Asn
545 550 555 560
Asp Ser Cys Pro Glu Val Lys Val Phe Glu Asp Ile Ser Ala Asn Thr
565 570 575
Val Asn Met Ala Leu Gln Ile Pro Gln Tyr Phe Leu Leu Thr Cys Gly
580 585 590
Glu Val Val Phe Ser Val Thr Gly Leu Glu Phe Ser Tyr Ser Gln Ala
595 600 605
Pro Ser Asn Met Lys Ser Val Leu Gln Ala Gly Trp Leu Leu Thr Val
610 615 620
Ala Val Gly Asn Ile Ile Val Leu Ile Val Ala Gly Ala Gly Gln Phe
625 630 635 640
Ser Lys Gln Trp Ala Glu Tyr Ile Leu Phe Ala Ala Leu Leu Leu Val
645 650 655
Val Cys Val Ile Phe Ala Ile Met Ala Arg Phe Tyr Thr Tyr Ile Asn
660 665 670

Pro Ala Glu Ile Glu Ala Gln Phe Asp Glu Asp Glu Lys Lys Asn Arg
675 680 685
Leu Glu Lys Ser Asn Pro Tyr Phe Met Ser Gly Ala Asn Ser Gln Lys
690 695 700
Gln Met
705

<210> 15
<211> 710
<212> PRT
<213> Rattus norvegicus

<400> 15
Met Gly Met Ser Lys Ser Arg Gly Cys Phe Gly Tyr Pro Leu Ser Ile
1 5 10 15
Phe Phe Ile Val Val Asn Glu Phe Cys Glu Arg Phe Ser Tyr Tyr Gly
20 25 30
Met Arg Ala Leu Leu Val Leu Tyr Phe Arg Asn Phe Leu Gly Trp Asp
35 40 45
Asp Asp Leu Ser Thr Ala Ile Tyr His Thr Phe Val Ala Leu Cys Tyr
50 55 60
Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala Asp Ser Trp Leu Gly Lys
65 70 75 80
Phe Lys Thr Ile Val Ser Leu Ser Ile Val Tyr Thr Ile Gly Gln Ala
85 90 95
Val Ile Ser Val Ser Ser Ile Asn Asp Leu Thr Asp His Asp His Asp
100 105 110
Gly Ser Pro Asn Asn Leu Pro Leu His Val Ala Leu Ser Met Ile Gly
115 120 125
Leu Ala Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser
130 135 140
Ala Phe Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn
145 150 155 160
Arg Phe Phe Ser Ile Phe Tyr Leu Ala Ile Asn Ala Gly Ser Leu Leu
165 170 175
Ser Thr Ile Ile Thr Pro Ile Leu Arg Val Gln Gln Cys Gly Ile His
180 185 190
Ser Gln Gln Ala Cys Tyr Pro Leu Ala Phe Gly Val Pro Ala Ala Leu
195 200 205
Met Ala Val Ala Leu Ile Val Phe Val Leu Gly Ser Gly Met Tyr Lys
210 215 220
Lys Phe Gln Pro Gln Gly Asn Ile Met Gly Lys Val Ala Lys Cys Ile
225 230 235 240
Gly Phe Ala Ile Lys Asn Arg Phe Arg His Arg Ser Lys Ala Phe Pro
245 250 255
Lys Arg Glu His Trp Leu Asp Trp Ala Lys Glu Lys Tyr Asp Glu Arg
260 265 270
Leu Ile Ser Gln Ile Lys Met Val Thr Lys Val Met Phe Leu Tyr Ile
275 280 285
Pro Leu Pro Met Phe Trp Ala Leu Phe Asp Gln Gln Gly Ser Arg Trp
290 295 300
Thr Leu Gln Ala Thr Thr Met Thr Gly Lys Ile Gly Thr Ile Glu Ile
305 310 315 320
Gln Pro Asp Gln Met Gln Thr Val Asn Ala Ile Leu Ile Val Ile Met
325 330 335
Val Pro Ile Val Asp Ala Val Val Tyr Pro Leu Ile Ala Lys Cys Gly
340 345 350

```
Phe Asn Phe Thr Ser Leu Lys Lys Met Thr Val Gly Met Phe Leu Ala
        355                 360                 365
Ser Met Ala Phe Val Val Ala Ala Ile Val Gln Val Glu Ile Asp Lys
    370                 375                 380
Thr Leu Pro Val Phe Pro Ser Gly Asn Gln Val Gln Ile Lys Val Leu
385                 390                 395                 400
Asn Ile Gly Asn Asn Asp Met Ala Val Tyr Phe Pro Gly Lys Asn Val
                405                 410                 415
Thr Val Ala Gln Met Ser Gln Thr Asp Thr Phe Met Thr Phe Asp Val
            420                 425                 430
Asp Gln Leu Thr Ser Ile Asn Val Ser Ser Pro Gly Ser Pro Gly Val
        435                 440                 445
Thr Thr Val Ala His Glu Phe Glu Pro Gly His Arg His Thr Leu Leu
    450                 455                 460
Val Trp Gly Pro Asn Leu Tyr Arg Val Val Lys Asp Gly Leu Asn Gln
465                 470                 475                 480
Lys Pro Glu Lys Gly Glu Asn Gly Ile Arg Phe Val Ser Thr Leu Asn
                485                 490                 495
Glu Met Ile Thr Ile Lys Met Ser Gly Lys Val Tyr Glu Asn Val Thr
            500                 505                 510
Ser His Ser Ala Ser Asn Tyr Gln Phe Phe Pro Ser Gly Gln Lys Asp
        515                 520                 525
Tyr Thr Ile Asn Thr Thr Glu Ile Ala Pro Asn Cys Ser Ser Asp Phe
    530                 535                 540
Lys Ser Ser Asn Leu Asp Phe Gly Ser Ala Tyr Thr Tyr Val Ile Arg
545                 550                 555                 560
Ser Arg Ala Ser Asp Gly Cys Leu Glu Val Lys Glu Phe Glu Asp Ile
                565                 570                 575
Pro Pro Asn Thr Val Asn Met Ala Leu Gln Ile Pro Gln Tyr Phe Leu
            580                 585                 590
Leu Thr Cys Gly Glu Val Val Phe Ser Val Thr Gly Leu Glu Phe Ser
        595                 600                 605
Tyr Ser Gln Ala Pro Ser Asn Met Lys Ser Val Leu Gln Ala Gly Trp
    610                 615                 620
Leu Leu Thr Val Ala Ile Gly Asn Ile Ile Val Leu Ile Val Ala Glu
625                 630                 635                 640
Ala Gly His Phe Asp Lys Gln Trp Ala Glu Tyr Val Leu Phe Ala Ser
                645                 650                 655
Leu Leu Leu Val Val Cys Ile Ile Phe Ala Ile Met Ala Arg Phe Tyr
            660                 665                 670
Thr Tyr Ile Asn Pro Ala Glu Ile Glu Ala Gln Phe Asp Glu Asp Glu
        675                 680                 685
Lys Lys Lys Gly Val Gly Lys Glu Asn Pro Tyr Ser Ser Leu Glu Pro
    690                 695                 700
Val Ser Gln Thr Asn Met
705                 710
```

<210> 16
<211> 709
<212> PRT
<213> Mus musculus

<400> 16

```
Met Gly Met Ser Lys Ser Arg Gly Cys Phe Gly Tyr Pro Leu Ser Ile
 1               5                  10                  15
Phe Phe Ile Val Val Asn Glu Phe Cys Glu Arg Phe Ser Tyr Tyr Gly
            20                  25                  30
```

Met Arg Ala Leu Leu Val Leu Tyr Phe Arg Asn Phe Leu Gly Trp Asp
35 40 45
Asp Asn Leu Ser Thr Ala Ile Tyr His Thr Phe Val Ala Leu Cys Tyr
50 55 60
Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala Asp Ser Trp Leu Gly Lys
65 70 75 80
Phe Lys Thr Ile Val Ser Leu Ser Ile Val Tyr Thr Ile Gly Gln Ala
85 90 95
Val Ile Ser Val Ser Ser Ile Asn Asp Leu Thr Asp His Asp His Asn
100 105 110
Gly Ser Pro Asp Ser Leu Pro Val His Val Ala Leu Ser Met Val Gly
115 120 125
Leu Ala Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser
130 135 140
Ala Phe Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn
145 150 155 160
Arg Phe Phe Ser Ile Phe Tyr Leu Ala Ile Asn Gly Gly Ser Leu Leu
165 170 175
Ser Thr Ile Ile Thr Pro Ile Leu Arg Val Gln Gln Cys Gly Ile His
180 185 190
Ser Gln Gln Ala Cys Tyr Pro Leu Ala Phe Gly Val Pro Ala Ala Leu
195 200 205
Met Ala Val Ala Leu Ile Val Phe Val Leu Gly Ser Gly Met Tyr Lys
210 215 220
Lys Phe Gln Pro Gln Gly Asn Ile Met Gly Lys Val Ala Lys Cys Ile
225 230 235 240
Gly Phe Ala Ile Lys Asn Arg Phe Arg His Arg Ser Lys Ala Tyr Pro
245 250 255
Lys Arg Glu His Trp Leu Asp Trp Ala Lys Glu Lys Tyr Asp Glu Arg
260 265 270
Leu Ile Ser Gln Ile Lys Met Val Thr Lys Val Met Phe Leu Phe Ile
275 280 285
Pro Leu Pro Met Phe Trp Gly Leu Phe Asp Gln Gln Gly Ser Arg Trp
290 295 300
Thr Leu Gln Ala Thr Thr Met Asn Gly Lys Ile Gly Ala Asn Glu Ile
305 310 315 320
Gln Pro Asp Gln Met Gln Thr Val Asn Ala Ile Leu Asn Val Asn Asn
325 330 335
Gly Pro Asn Val Asp Ala Val Val Tyr Arg Ser Ile Ala Lys Cys Gly
340 345 350
Phe Asn Phe Thr Ser Leu Lys Lys Met Thr Val Gly Met Phe Leu Ala
355 360 365
Ser Met Ala Phe Val Val Ala Ala Ile Val Gln Val Glu Ile Asp Lys
370 375 380
Thr Leu Pro Val Phe Pro Gly Gly Asn Gln Val Gln Ile Lys Val Leu
385 390 395 400
Asn Ile Gly Asn Asn Asn Met Thr Val His Phe Pro Gly Asn Ser Val
405 410 415
Thr Leu Ala Gln Met Ser Gln Thr Asp Thr Phe Met Thr Phe Asp Ile
420 425 430
Asp Lys Leu Thr Ser Ile Asn Ile Ser Ser Ser Gly Ser Pro Gly Val
435 440 445
Thr Thr Val Ala His Asp Phe Glu Gln Gly His Arg His Asn Leu Leu
450 455 460
Val Trp Glu Pro Ser Gln Tyr Arg Val Val Lys Asp Gly Pro Asn Gln
465 470 475 480
Lys Pro Glu Lys Gly Glu Asn Gly Ile Arg Phe Val Asn Thr Leu Asn
485 490 495

Glu Met Val Thr Asn Lys Met Ser Gly Lys Val Tyr Glu Lys Phe Thr
500 505 510
Ser His Asn Ala Ser Gly Tyr Lys Phe Leu Pro Ser Gly Glu Lys Gln
515 520 525
Tyr Thr Ile Asn Thr Thr Ala Val Ala Pro Thr Cys Leu Thr Asp Phe
530 535 540
Lys Ser Ser Asn Leu Asp Phe Gly Ser Ala Tyr Thr Tyr Val Ile Arg
545 550 555 560
Arg Ala Ser Asp Gly Cys Leu Glu Val Lys Glu Phe Glu Asp Ile Pro
565 570 575
Pro Asn Thr Val Asn Met Ala Leu Gln Ile Pro Gln Tyr Phe Leu Leu
580 585 590
Thr Cys Gly Glu Val Val Phe Ser Val Thr Gly Leu Glu Phe Ser Tyr
595 600 605
Ser Gln Ala Pro Ser Asn Met Lys Ser Val Leu Gln Ala Gly Trp Leu
610 615 620
Leu Thr Val Ala Val Gly Asn Ile Ile Val Leu Ile Val Ala Gly Ala
625 630 635 640
Gly His Phe Pro Lys Gln Trp Ala Glu Tyr Ile Leu Phe Ala Ser Leu
645 650 655
Leu Leu Val Val Cys Val Ile Phe Ala Ile Met Ala Arg Phe Tyr Thr
660 665 670
Tyr Ile Asn Pro Ala Glu Ile Glu Ala Gln Phe Asp Glu Asp Glu Lys
675 680 685
Lys Lys Gly Ile Gly Lys Glu Asn Pro Tyr Ser Ser Leu Glu Pro Val
690 695 700
Ser Gln Thr Asn Met
705

<210> 17
<211> 707
<212> PRT
<213> Ovis aries

<400> 17
Met Gly Met Ser Val Pro Lys Ser Cys Phe Gly Tyr Pro Leu Ser Ile
1 5 10 15
Phe Phe Ile Val Val Asn Glu Phe Cys Glu Arg Phe Ser Tyr Tyr Gly
20 25 30
Met Arg Ala Leu Leu Ile Leu Tyr Phe Gln Arg Phe Leu Gly Trp Asn
35 40 45
Asp Asn Leu Gly Thr Ala Ile Tyr His Thr Phe Val Ala Leu Cys Tyr
50 55 60
Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala Asp Ser Trp Leu Gly Lys
65 70 75 80
Phe Lys Thr Ile Val Ser Leu Ser Ile Val Tyr Thr Ile Gly Gln Val
85 90 95
Val Ile Ala Val Ser Ser Ile Asn Asp Leu Thr Asp Phe Asn His Asp
100 105 110
Gly Thr Pro Asn Asn Ile Ser Val His Val Ala Leu Ser Met Ile Gly
115 120 125
Leu Val Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser
130 135 140
Ala Phe Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn
145 150 155 160
Arg Phe Phe Ser Ile Phe Tyr Leu Ala Ile Asn Ala Gly Ser Leu Leu
165 170 175

```
Ser Thr Ile Ile Thr Pro Met Leu Arg Val Gln Val Cys Gly Ile His
            180                 185                 190
Ser Lys Gln Ala Cys Tyr Pro Leu Ala Phe Gly Val Pro Ala Ala Leu
        195                 200                 205
Met Ala Val Ser Leu Ile Val Phe Val Ile Gly Ser Gly Met Tyr Lys
    210                 215                 220
Lys Val Gln Pro Gln Gly Asn Ile Met Ser Lys Val Ala Arg Cys Ile
225                 230                 235                 240
Gly Phe Ala Ile Lys Asn Arg Ile Ser His Arg Ser Lys Lys Phe Pro
                245                 250                 255
Lys Arg Glu His Trp Leu Asp Trp Ala Ser Glu Lys Tyr Asp Glu Arg
            260                 265                 270
Leu Ile Ser Gln Ile Lys Met Val Thr Arg Val Met Phe Leu Tyr Ile
        275                 280                 285
Pro Leu Pro Met Phe Trp Ala Leu Phe Asp Gln Gln Gly Ser Arg Trp
    290                 295                 300
Thr Leu Gln Ala Thr Thr Met Ser Gly Lys Ile Gly Ile Ile Glu Ile
305                 310                 315                 320
Gln Pro Asp Gln Met Gln Thr Val Asn Ala Ile Leu Ile Val Val Met
                325                 330                 335
Val Pro Ile Val Asp Ala Val Val Tyr Pro Leu Ile Ala Lys Cys Gly
            340                 345                 350
Leu Asn Phe Thr Ser Leu Lys Lys Met Thr Val Gly Met Phe Leu Ala
        355                 360                 365
Ser Met Ala Phe Val Ala Ala Ala Ile Val Gln Val Asp Ile Asp Lys
    370                 375                 380
Thr Leu Pro Val Phe Pro Lys Gly Asn Glu Val Gln Ile Lys Val Leu
385                 390                 395                 400
Asn Ile Gly Asn Asn Ser Met Thr Val Ser Phe Pro Gly Thr Thr Val
                405                 410                 415
Thr Cys Asp Gln Met Ser Gln Thr Asn Gly Phe Leu Thr Phe Asn Val
            420                 425                 430
Asp Asn Leu Ser Ile Asn Ile Ser Ser Thr Gly Thr Pro Val Thr Pro
        435                 440                 445
Val Thr His Asn Phe Glu Ser Gly His Arg His Thr Leu Leu Val Trp
    450                 455                 460
Ala Pro Ser Asn Tyr Gln Val Val Lys Asp Gly Leu Asn Gln Lys Pro
465                 470                 475                 480
Glu Lys Gly Arg Asn Gly Ile Arg Phe Val Asn Ala Phe Gly Glu Ser
                485                 490                 495
Phe Gly Val Thr Met Asp Gly Glu Val Tyr Asn Asn Val Ser Gly His
            500                 505                 510
Asn Ala Ser Glu Tyr Leu Phe Phe Ser Ser Gly Val Lys Ser Phe Thr
        515                 520                 525
Ile Asn Ser Pro Glu Ile Ser Gln Gln Cys Glu Lys Gln Phe Lys Thr
    530                 535                 540
Ser Tyr Leu Glu Phe Gly Ser Ala Phe Thr Tyr Val Ile Ser Arg Lys
545                 550                 555                 560
Ser Asp Gly Cys Pro Glu Pro Lys Ile Phe Glu Asp Ile Ser Pro Asn
                565                 570                 575
Thr Val Ser Met Ala Leu Gln Ile Pro Gln Tyr Phe Leu Leu Thr Cys
            580                 585                 590
Gly Glu Val Val Phe Ser Ile Thr Gly Leu Glu Phe Ser Tyr Ser Gln
        595                 600                 605
Ala Pro Ser Asn Met Lys Ser Val Leu Gln Ala Gly Trp Leu Leu Thr
    610                 615                 620
Val Ala Val Gly Asn Ile Ile Val Leu Ile Val Ala Gly Ala Gly Gln
625                 630                 635                 640
```

```
Phe Ser Glu Gln Trp Ala Glu Tyr Val Leu Phe Ala Ala Leu Leu Leu
                645                 650                 655
Val Val Cys Ile Ile Phe Ala Ile Met Ala Arg Phe Tyr Thr Tyr Val
            660                 665                 670
Asn Pro Ala Glu Ile Glu Ala Gln Phe Asp Glu Asp Asp Lys Glu Asp
        675                 680                 685
Asp Leu Glu Lys Ser Asn Pro Tyr Ala Lys Leu Asp Phe Val Ser Gln
    690                 695                 700
Thr Gln Met
705
```

<210> 18
<211> 707
<212> PRT
<213> Oryctolagus cuniculus

<400> 18

```
Met Gly Met Ser Lys Ser Leu Ser Cys Phe Gly Tyr Pro Leu Ser Ile
 1               5                  10                  15
Phe Phe Ile Val Val Asn Glu Phe Cys Glu Arg Phe Ser Tyr Tyr Gly
            20                  25                  30
Met Arg Ala Leu Leu Ile Leu Tyr Phe Arg Asn Phe Ile Gly Trp Asp
        35                  40                  45
Asp Asn Leu Ser Thr Val Ile Tyr His Thr Phe Val Ala Leu Cys Tyr
    50                  55                  60
Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala Asp Ala Trp Leu Gly Lys
65                  70                  75                  80
Phe Lys Thr Ile Val Trp Leu Ser Ile Val Tyr Thr Ile Gly Gln Ala
                85                  90                  95
Val Thr Ser Leu Ser Ser Val Asn Glu Leu Thr Asp Asn Asn His Asp
            100                 105                 110
Gly Thr Pro Asp Ser Leu Pro Val His Val Ala Val Cys Met Ile Gly
        115                 120                 125
Leu Leu Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser
    130                 135                 140
Ala Phe Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn
145                 150                 155                 160
Arg Phe Phe Ser Ile Phe Tyr Leu Ala Ile Asn Ala Gly Ser Leu Leu
                165                 170                 175
Ser Thr Ile Ile Thr Pro Met Val Arg Val Gln Gln Cys Gly Ile His
            180                 185                 190
Val Lys Gln Ala Cys Tyr Pro Leu Ala Phe Gly Ile Pro Ala Ile Leu
        195                 200                 205
Met Ala Val Ser Leu Ile Val Phe Ile Ile Gly Ser Gly Met Tyr Lys
    210                 215                 220
Lys Phe Lys Pro Gln Gly Asn Ile Leu Ser Lys Val Val Lys Cys Ile
225                 230                 235                 240
Cys Phe Ala Ile Lys Asn Arg Phe Arg His Arg Ser Lys Gln Phe Pro
                245                 250                 255
Lys Arg Ala His Trp Leu Asp Trp Ala Lys Glu Lys Tyr Asp Glu Arg
            260                 265                 270
Leu Ile Ala Gln Ile Lys Met Val Thr Arg Val Leu Phe Leu Tyr Ile
        275                 280                 285
Pro Leu Pro Met Phe Trp Ala Leu Phe Asp Gln Gln Gly Ser Arg Trp
    290                 295                 300
Thr Leu Gln Ala Thr Thr Met Ser Gly Arg Ile Gly Ile Leu Glu Ile
305                 310                 315                 320
```

```
Gln Pro Asp Gln Met Gln Thr Val Asn Thr Ile Leu Ile Ile Ile Leu
                325                 330                 335
Val Pro Ile Met Asp Ala Val Val Tyr Pro Leu Ile Ala Lys Cys Gly
            340                 345                 350
Leu Asn Phe Thr Ser Leu Lys Lys Met Thr Ile Gly Met Phe Leu Ala
        355                 360                 365
Ser Met Ala Phe Val Ala Ala Ala Ile Leu Gln Val Glu Ile Asp Lys
    370                 375                 380
Thr Leu Pro Val Phe Pro Lys Ala Asn Glu Val Gln Ile Lys Val Leu
385                 390                 395                 400
Asn Val Gly Ser Glu Asn Met Ile Ile Ser Leu Pro Gly Gln Thr Val
                405                 410                 415
Thr Leu Asn Gln Met Ser Gln Thr Asn Glu Phe Met Thr Phe Asn Glu
            420                 425                 430
Asp Thr Leu Thr Ser Ile Asn Ile Thr Ser Gly Ser Gln Val Thr Met
        435                 440                 445
Ile Thr Pro Ser Leu Glu Ala Gly Gln Arg His Thr Leu Leu Val Trp
    450                 455                 460
Ala Pro Asn Asn Tyr Arg Val Val Asn Asp Gly Leu Thr Gln Lys Ser
465                 470                 475                 480
Asp Lys Gly Glu Asn Gly Ile Arg Phe Val Asn Thr Tyr Ser Gln Pro
                485                 490                 495
Ile Asn Val Thr Met Ser Gly Lys Val Tyr Glu His Ile Ala Ser Tyr
            500                 505                 510
Asn Ala Ser Glu Tyr Gln Phe Phe Thr Ser Gly Val Lys Gly Phe Thr
        515                 520                 525
Val Ser Ser Ala Gly Ile Ser Glu Gln Cys Arg Arg Asp Phe Glu Ser
    530                 535                 540
Pro Tyr Leu Glu Phe Gly Ser Ala Tyr Thr Tyr Leu Ile Thr Ser Gln
545                 550                 555                 560
Ala Thr Gly Cys Pro Gln Val Thr Glu Phe Glu Asp Ile Pro Pro Asn
                565                 570                 575
Thr Met Asn Met Ala Trp Gln Ile Pro Gln Tyr Phe Leu Ile Thr Ser
            580                 585                 590
Gly Glu Val Val Phe Ser Ile Thr Gly Leu Glu Phe Ser Tyr Ser Gln
        595                 600                 605
Ala Pro Ser Asn Met Lys Ser Val Leu Gln Asp Arg Trp Leu Leu Thr
    610                 615                 620
Val Ala Val Gly Asn Ile Ile Val Leu Ile Val Ala Gly Ala Gly Gln
625                 630                 635                 640
Ile Asn Lys Gln Trp Ala Glu Tyr Ile Leu Phe Ala Ala Leu Leu Leu
                645                 650                 655
Val Val Cys Val Ile Phe Ala Ile Met Ala Arg Phe Tyr Thr Tyr Val
            660                 665                 670
Asn Pro Ala Glu Ile Glu Ala Gln Phe Glu Glu Asp Glu Lys Lys Lys
        675                 680                 685
Asn Pro Glu Lys Asn Asp Leu Tyr Pro Ser Val Ala Pro Val Ser Gln
    690                 695                 700
Thr Gln Met
705
```

<210> 19
<211> 714
<212> PRT
<213> Gallus gallus

<400> 19

```
Met Ala Ala Lys Ser Lys Ser Lys Gly Arg Ser Val Pro Asn Cys Phe
 1               5                  10                  15
Gly Tyr Pro Leu Ser Ile Phe Phe Ile Val Ile Asn Glu Phe Cys Glu
            20                  25                  30
Arg Phe Ser Tyr Tyr Gly Met Arg Ala Val Leu Val Leu Tyr Phe Lys
        35                  40                  45
Tyr Phe Leu Arg Trp Asp Asp Asn Phe Ser Thr Ala Ile Tyr His Thr
    50                  55                  60
Phe Val Ala Leu Cys Tyr Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala
65                  70                  75                  80
Asp Ser Trp Leu Gly Lys Phe Lys Thr Ile Val Ser Leu Ser Ile Val
                85                  90                  95
Tyr Thr Ile Gly Gln Ala Val Met Ala Val Ser Ser Ile Asn Asp Met
            100                 105                 110
Thr Asp Gln Asn Arg Asp Gly Asn Pro Asp Asn Ile Ala Val His Ile
        115                 120                 125
Ala Leu Ser Met Thr Gly Leu Ile Leu Ile Ala Leu Gly Thr Gly Gly
    130                 135                 140
Ile Lys Pro Cys Val Ser Ala Phe Gly Gly Asp Gln Phe Glu Glu His
145                 150                 155                 160
Gln Glu Lys Gln Arg Ser Arg Phe Phe Ser Ile Phe Tyr Leu Ser Ile
                165                 170                 175
Asn Ala Gly Ser Leu Ile Ser Thr Ile Ile Thr Pro Ile Leu Arg Ala
            180                 185                 190
Gln Glu Cys Gly Ile His Ser Arg Gln Gln Cys Tyr Pro Leu Ala Phe
        195                 200                 205
Gly Val Pro Ala Ala Leu Met Ala Val Ser Leu Val Val Phe Ile Ala
    210                 215                 220
Gly Ser Gly Met Tyr Lys Lys Val Gln Pro Gln Gly Asn Ile Met Val
225                 230                 235                 240
Arg Val Cys Lys Cys Ile Gly Phe Ala Ile Lys Asn Arg Phe Arg His
                245                 250                 255
Arg Ser Lys Glu Tyr Pro Lys Arg Glu His Trp Leu Asp Trp Ala Ser
            260                 265                 270
Glu Lys Tyr Asp Lys Arg Leu Ile Ala Gln Thr Lys Met Val Leu Lys
        275                 280                 285
Val Leu Phe Leu Tyr Ile Pro Leu Pro Met Phe Trp Ala Leu Phe Asp
    290                 295                 300
Gln Gln Gly Ser Arg Trp Thr Leu Gln Ala Thr Thr Met Asp Gly Asp
305                 310                 315                 320
Phe Gly Ala Met Gln Ile Gln Pro Asp Gln Met Gln Thr Val Asn Pro
                325                 330                 335
Ile Leu Ile Ile Ile Met Val Pro Val Val Asp Ala Val Ile Tyr Pro
            340                 345                 350
Leu Ile Gln Lys Cys Lys Ile Asn Phe Thr Pro Leu Arg Arg Ile Thr
        355                 360                 365
Val Gly Met Phe Leu Ala Gly Leu Ala Phe Val Ala Ala Ala Leu Leu
    370                 375                 380
Gln Val Gln Ile Asp Lys Thr Leu Pro Val Phe Pro Ala Ala Gly Gln
385                 390                 395                 400
Ala Gln Ile Lys Ile Ile Asn Leu Gly Asp Ser Asn Ala Asn Val Thr
                405                 410                 415
Phe Leu Pro Asn Leu Gln Asn Val Thr Val Leu Pro Met Glu Ser Thr
            420                 425                 430
Gly Tyr Arg Met Phe Glu Ser Ser Gln Leu Lys Ser Val Met Val Asn
        435                 440                 445
```

```
Phe Gly Ser Glu Ser Arg Ser Glu Asn Ile Asp Ser Ile Ser Ser Asn
    450                 455                 460
Thr His Thr Val Thr Ile Lys Asn Ala Ala Ala Gly Ile Val Ser Ser
465                 470                 475                 480
Leu Arg Ser Asp Asn Phe Thr Ser Lys Pro Glu Glu Gly Lys Asn Leu
                485                 490                 495
Val Arg Phe Val Asn Asn Leu Pro Gln Thr Val Asn Ile Thr Met Gly
            500                 505                 510
Asp Thr Thr Phe Gly Ile Leu Glu Glu Thr Ser Ile Ser Asn Tyr Ser
        515                 520                 525
Pro Phe Ser Gly Gly Arg Thr Tyr Asp Ile Val Ile Thr Ala Gly Ser
    530                 535                 540
Thr Asn Cys Lys Pro Thr Ser Glu Lys Leu Gly Tyr Gly Gly Ala Tyr
545                 550                 555                 560
Thr Ile Val Ile Asn Glu Cys Ser Gly Asp Val Thr Gln Leu Arg Tyr
                565                 570                 575
Ile Glu Asp Ile Gln Pro Asn Thr Val His Met Ala Trp Gln Ile Pro
            580                 585                 590
Gln Tyr Phe Ile Leu Thr Cys Gly Glu Val Val Phe Ser Val Thr Gly
        595                 600                 605
Leu Glu Phe Ser Tyr Ser Gln Ala Pro Ser Asn Met Lys Ser Val Leu
    610                 615                 620
Gln Ala Gly Trp Leu Leu Thr Val Ala Val Gly Asn Ile Ile Val Leu
625                 630                 635                 640
Ile Val Ala Gly Ala Ser Lys Leu Ser Glu Gln Trp Ala Glu Tyr Val
                645                 650                 655
Leu Phe Ala Ala Leu Leu Phe Ala Val Cys Ile Ile Phe Ala Val Met
            660                 665                 670
Ala Tyr Phe Tyr Thr Tyr Thr Asp Pro Asn Glu Val Glu Ala Gln Leu
        675                 680                 685
Asp Glu Glu Glu Lys Lys Lys Gln Ile Lys Gln Asp Pro Asp Leu His
    690                 695                 700
Gly Lys Glu Ser Glu Ala Val Ser Gln Met
705                 710
```

<210> 20
<211> 2124
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Met Arg Ala Leu Leu Ile Leu Tyr Phe Arg Arg Phe Ile Gly Trp Asp
        35   40   45
Asp Asn Leu Ser Thr Ala Ile Tyr His Thr Phe Val Ala Leu Cys Tyr
    50   55   60
Leu Thr Pro Ile Leu Gly Ala Leu Ile Ala Asp Ser Trp Leu Gly Lys
65   70   75   80
Phe Lys Thr Ile Val Ser Leu Ser Ile Val Tyr Thr Ile Gly Gln Ala
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Val Thr Ala Val Ser Ser Ile Asn Asp Leu Thr Asp Tyr Asn Lys Asp
            100   105   110
Gly Thr Pro Asp Asn Leu Ser Val His Val Ala Leu Ser Met Ile Gly
        115   120   125
Leu Ala Leu Ile Ala Leu Gly Thr Gly Gly Ile Lys Pro Cys Val Ser
    130   135   140
Ala Phe Gly Gly Asp Gln Phe Glu Glu Gly Gln Glu Lys Gln Arg Asn
145   150   155   160
Arg Phe Phe Ser Ile Phe Tyr Leu Ala Ile Asn Ala Gly Ser Leu Ile
                165   170   175
Ser Thr Ile Val Thr Pro Met Leu Arg Val His Glu Cys Gly Ile Tyr
            180   185   190
Ser Gln Lys Ala Cys Tyr Pro Leu Ala Phe Gly Val Pro Ala Ala Leu
        195   200   205
Met Ala Val Ser Leu Ile Val Phe Val Ile Gly Ser Gly Met Tyr Lys
    210   215   220
Lys Phe Gln Pro Gln Gly Asn Val Met Gly Lys Val Val Lys Cys Ile
225   230   235   240
Gly Phe Ala Leu Lys Asn Arg Phe Arg His Arg Ser Lys Gln Phe Pro
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Lys Arg Glu His Trp Leu Asp Trp Ala Lys Glu Lys Tyr Asp Glu Arg
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Leu Ile Ser Gln Ile Lys Met Val Thr Lys Val Met Phe Leu Tyr Ile
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Pro Leu Pro Met Phe Trp Ala Leu Phe Asp Gln Gln Gly Ser Arg Trp
290 295 300
Thr Leu Gln Ala Thr Ala Met Ser Gly Lys Ile Gly Leu Leu Glu Val
305 310 315 320
Gln Pro Asp Gln Met Gln Thr Val Asn Ala Ile Leu Ile Val Val Met
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370 375 380
Thr Leu Pro Val Phe Pro Lys Gln Asn Glu Val Gln Ile Lys Val Leu
385 390 395 400
Asn Ile Gly Asn Gly Ala Met Asn Val Ser Phe Pro Gly Ala Val Val
405 410 415
Thr Val Ser Gln Met Ser Gln Ser Asp Gly Phe Met Thr Phe Asp Val
420 425 430
Asp Lys Leu Thr Ser Ile Asn Ile Ser Ser Thr Gly Ser Pro Val Ile
435 440 445
Pro Val Thr Tyr Asn Phe Glu Gln Gly His Arg His Thr Leu Leu Val
450 455 460
Trp Ala Pro Asn Asn Tyr Arg Val Val Lys Asp Gly Leu Asn Gln Lys
465 470 475 480
Pro Glu Lys Gly Glu Asn Gly Ile Arg Phe Ile Asn Ser Leu Asn Glu
485 490 495
Ser Leu Asn Ile Thr Met Gly Asp Lys Val Tyr Val Asn Val Thr Ser
500 505 510
His Asn Ala Ser Glu Tyr Gln Phe Phe Ser Leu Gly Thr Lys Asn Ile
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Thr Ile Ser Ser Thr Gln Gln Ile Ser Gln Asn Cys Thr Lys Val Leu
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Gln Ser Ser Asn Leu Glu Phe Gly Ser Ala Tyr Thr Tyr Val Ile Gly
545 550 555 560
Thr Gln Ser Thr Gly Cys Pro Glu Leu His Met Phe Glu Asp Ile Ser
565 570 575
Pro Asn Thr Val Asn Met Ala Leu Gln Ile Pro Gln Tyr Phe Leu Ile
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Thr Cys Gly Glu Val Val Phe Ser Val Thr Gly Leu Glu Phe Ser Tyr
595 600 605
Ser Gln Ala Pro Ser Asn Met Lys Ser Val Leu Gln Ala Gly Trp Leu
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Leu Thr Val Ala Val Gly Asn Ile Ile Val Leu Ile Val Ala Gly Ala
625 630 635 640
Gly Gln Phe Ser Glu Gln Trp Ala Glu Tyr Ile Leu Phe Ala Ala Leu
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Leu Leu Val Val Cys Val Ile Phe Ala Ile Met Ala Arg Phe Tyr Thr
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Tyr Val Asn Pro Ala Glu Ile Glu Ala Gln Phe Asp Asp Asp Glu Lys
675 680 685
Lys Asn Leu Glu Lys Met Asn Val Tyr Ser Thr Val Thr Pro Val Ser
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Gln Thr Gln Met
705